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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/592,285	06/12/2000	KEN UTAGAWA	106477	5210

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EXAMINER

EDWARDS, PATRICK L

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 01/20/2004

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/592,285

Applicant(s)

UTAGAWA, KEN

Examiner

Patrick L Edwards

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 1, 2 and 4-22 is/are rejected.
- 7) ☐ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Specification

1(a). The incorporation of essential material on page 1 lines 5-10 of the specification by reference to foreign applications is improper. Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by an affidavit or declaration executed by the applicant, or a practitioner representing the applicant, stating that the amendatory material consists of the same material incorporated by reference in the referencing application. See *In re Hawkins*, 486 F.2d 569, 179 USPQ 157 (CCPA 1973); *In re Hawkins*, 486 F.2d 579, 179 USPQ 163 (CCPA 1973); and *In re Hawkins*, 486 F.2d 577, 179 USPQ 167 (CCPA 1973).

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 6-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 depends back to claim 4. Claim 4 states that similarity is judged based upon at least two types of color information in said color image data. Claim 6 recites that similarity values can be calculated using characteristics differences among a plurality of same color pixels. It seems that the claim 4 requirement for two types of color information is inconsistent with the claim 6 option of calculating similarity values using only same color pixels. Appropriate correction is required.

Claims 7 and 8 are rejected as being dependent on an indefinite claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 14, 17, 19, 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Fang et al. (USPN 5,771,318).

With regard to claim 17, which is representative of claim 1, Fang discloses an image processing apparatus that implements low-pass filtering on image data (column 3 line 11). The smoothing filter disclosed in Fang is analogous to the low-pass filter as recited in the claims. Fang further discloses a means for similarity judgment that judges similarity among pixels along at least four directions in a local area containing a target pixel undergoing low-pass filtering processing (column 3 line 63 – column 4 line 25). The calculation of the local directional variances as disclosed in Fang is analogous to the similarity judgment recited in the claims in that it judges similarity among pixels along at least four directions in a local area containing a target pixel $y(i,j)$ undergoing low-pass filtering. Fang further discloses a means for direction dependent low-pass filtering that performs a weighted averaging operation in which weighted pixel values of pixels around the target pixel are added to the pixel value of said target pixel and the result of addition is divided by the sum of the weights (column 4 lines 35-50). Fang further discloses a weighting rate, along a direction manifesting marked similarity, becoming increased based upon the similarity judgment (column 4 lines 43-55).

With regard to claim 2, Fang discloses that similarity is judged by using characteristics differences among a plurality of pixels located on lines passing through said target pixel along specific directions (column 4 lines 33-37 in conjunction with Figure 1). The directional variance as disclosed in Fang is analogous to characteristic differences as recited in the claim.

With regard to claim 14, Fang discloses a weighting rate that approaches 0 in a direction that has a least degree of similarity (column 4 lines 45-48).

With regard to claim 19, a computer-readable recording medium that stores a program which causes the computer to execute the steps of a method is essential if the image processing method disclosed in Fang is to function. Therefore, a computer-readable recording medium is inherent in the teachings of Fang.

With regard to claim 20, a data signal that transmits, via a transmission line, an image processing program which causes the computer to execute the steps of a method is essential if the image processing method disclosed in Fang is to function. Therefore, this data signal is inherent in the teachings of Fang.

With regard to claim 21, Fang discloses a direction-dependent low-pass filtering step with four weighting rates corresponding to four different filter directions. It can be seen in Figure 1 that one of weighting rates is applied for the pixels to the left and right of the target pixel, one of the weighting rates is applied for the pixels above and below the target pixel, one of the weighting rates is applied for the pixel above the target pixel on the right and below the target pixel on the left, and one of the weighting rates is applied for the pixel above the target pixel on the left and below the target pixel on the right. Although Fang does not explicitly state that the target pixel itself has a weighting rate associated with, we can see from Figure 1 that the target pixel is used in the determination of all of the four other weighting rates. As a result, a first weighting rate for the target pixel is inherent in Fang's direction-dependent low-pass filtering step.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4-7 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang in view of Shiraishi (USPN 5,253,046). The arguments as to the relevance of Fang as applied in paragraph 4 above are incorporated herein.

With regard to claim 4, Fang discloses a similarity judging step, but fails to expressly disclose that the image data being judged is a color image with at least two types of color information. Shiraishi, however, discloses performing processing on at least two types of color information (Shiraishi column 10 lines 59-61 in conjunction with element 112 of Figure 6). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Fang's similarity judging system by adding color image processing capability as taught by Shiraishi. Such a modification would have made for a more robust system that could do similarity judging and subsequent low-pass filtering on additional types of images.

With regard to claim 5, Shiraishi further discloses that processing is performed on a color image that has yet to undergo interpolation processing (Shiraishi column 23 lines 45-49 in conjunction with Figure 28).

With regard to claim 6, the combination of Fang and Shiraishi discloses calculating similarity values along specific directions using characteristics differences of color image data. Calculating characteristics differences among a plurality of same color pixels and/or a plurality of different color pixels is inherent in the calculation of the characteristics differences of a color image along specific directions. Therefore, this is inherently taught in the combination of Fang and Shiraishi.

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With regard to claim 7, Shiraishi further discloses that the image processing is performed on color image data having undergone white balance processing (Shiraishi column 10 lines 55-61 in conjunction with element 111 of Figure 28).

With regard to claim 15, Shiraishi further discloses that the image data are generated by color separation in which reflected light is captured with color filters arranged in a bayer array (Shiraishi column 10 lines 49-55). Shiraishi goes on to disclose that processing is performed on the color separated R, G, B pixel data. It would have been obvious to one reasonably skilled in the art at the time of the invention to perform Fang's similarity judging step using color separated R, G, B pixel data as taught by Shiraishi. Such a modification would have allowed for a more robust system that could perform the low-pass filtering operation on color image data.

With regard to claim 16, The combination of Fang and Shiraishi discloses performing low-pass filtering on a color image which is composed of R, G, and B color image data (Shiraishi column 10 lines 56-58), brightness image data (Shiraishi column 10 lines 64-68), and color difference image data (Shiraishi column 19 lines 49-59). As a result, the limitation of implementing low-pass filtering on either G color image data, R color image data, B color image data, brightness image data, or color difference data is inherent in the combination of Fang and Shiraishi

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Fang and Shiraishi as applied to claim 6 above, and further in view of Ikeda (USPN 6,040,858). The arguments as to the relevance of the combination of Fang and Shiraishi as applied in paragraph 6 above are incorporated herein.

The combination of Fang and Shiraishi discloses all of the limitations of claim 8 except that it fails to expressly disclose the step of detecting a degree of saturation of a target pixel in the calculation of characteristics differences of a plurality of color pixels. Ikeda, however, discloses determining a saturated

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region of a color image in a low-pass filter environment (Ikeda column 3 lines 20-25). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the image processing method for low-pass filtering a color image as disclosed in the combination of Fang and Shiraishi by detecting a degree of saturation of the color pixels as taught by Ikeda. Such a modification would have allowed for a system in which characteristics differences of color pixels were detected with regard to saturation components of the color pixels in addition to the color components.

8. Claims 9-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang in view of Ikeda. The arguments as to the relevance of Fang as applied in paragraph 4 above are incorporated herein.

With regard to claim 9, Fang discloses a direction dependent low-pass filtering processing which is implemented on target pixels of an image data, but fails to expressly disclose that said image data undergoes interpolation processing to interpolate pixels with missing color components. Ikeda, however, discloses a low-pass filter environment in which color interpolation processing is performed (Ikeda column 6 lines 15-22 in conjunction with Figure 5). It would have been obvious to one reasonably skilled in the art at the time of the invention to combine the color image data interpolation processing as taught by Ikeda with Fang's method of performing directional dependent low-pass filtering on an image. Such a modification would have allowed for a more robust system that could perform the low-pass filtering operation on color image data that had previously been interpolated.

With regard to claim 10, Ikeda further discloses limiting pixel values of color pixels by a threshold corresponding to a largest pixel value or a smallest pixel value in a specific area near the corresponding pixel (Ikeda column 9 line 59 – column 10 line 14). It would have been obvious to one reasonably skilled in the art at the time of the invention to combine the limiting of pixel values by using maximum and minimum threshold values as taught by Ikeda with Fang's method of performing low-pass

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filtering on an image. Such a modification would have allowed for interpolation results which did not fall outside the upper and lower boundaries of the pixels in an area.

With regard to claim 11, Ikeda discloses performing interpolation processing on color image data that has yet to undergo low-pass filtering processing (Ikeda column 6 lines 15-19 in conjunction with Figure 5). It is well known in the art that a color image data in which one color (a first color) has a higher pixel density than another color (a second color) will inherently contain vacancies of color information. The steps of calculating a color difference between the first and second color, obtaining an interpolation value based on the difference, and then restoring the second color based on the interpolation are all inherent in the process of performing interpolation processing on color image data. Consequently, the limitations of the claim are inherent in the combination of Fang and Ikeda.

With regard to claim 13, it would have been obvious to obtain weighting rates using the first color, which has already been stated to be of a higher pixel density, and then use those same weighting rates for the weighted averaging, which has lower pixel density. Obtaining the weighting rates from the color which has the highest density would prevent the calculation of erroneous weighting rates. Applying these weighting rates to the weighted averaging of the lower pixel density colors would ensure that all colors were averaged with the most accurate rates.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Fang and Ikeda as applied to claim 11 above, and further in view of Shiraishi. The arguments as to the relevance of Fang and Ikeda as applied in paragraph 8 above are incorporated herein.

With regard to claim 12, Shiraishi further discloses that processing is performed on a color image that has yet to undergo interpolation processing (Shiraishi column 23 lines 45-49 in conjunction with Figure 28). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the direction dependent method of low-pass filtering a color image disclosed in the combination

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of Fang and Ikeda by including the further limitation of interpolating a color image that has already undergone image processing as taught by Shiraishi. Such a modification would have made for a more robust system that could interpolate the color image either before or after low-pass filtering of the image has been performed.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claim 17 above and further in view of well-known prior art. Claim 18 restates the limitations of claim 17, but states the "apparatus" as disclosed in claim 17 is an electronic camera. An electronic camera is well known in the art as a device for obtaining and processing image data (Official Notice). Although not explicitly stated in Fang, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use an electronic camera as an image processing apparatus. Such a modification would have allowed for performing the image processing using an apparatus which is very popular and has a ubiquitous global presence.

11. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang and well known prior art. The arguments as to the relevance of Fang as applied to claim 21 are incorporated herein. Fang discloses the first weighting rate for the target pixel is $(1/2m + 1)$ (Fang column 4 equations 10.1 – 10.4). The summation terms of those four equations, which are multiplied by $(1/2m + 1)$ as disclosed in Fang are analogous to t_t , y_y , u_u , and n_s as recited in the claim. The claimed value, k , which represents a predetermined value, is simply 1 in the equations of Fang. Although Fang does not expressly disclose that the terms analogous to claimed terms t_t , y_y , u_u and n_s add together to equal 1, this further limitation merely calls for the normalization of the four terms. Normalization is well known in the art (Official Notice), and it would have been obvious to a person of ordinary skill in the art at the time of the invention

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to include the normalization of the four terms. Such a modification would have resulted in more efficient computations.

Allowable Subject Matter

12. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
Ishiga et al. (US 2001/0005429 A1).
Okisu (USPN 6091862).

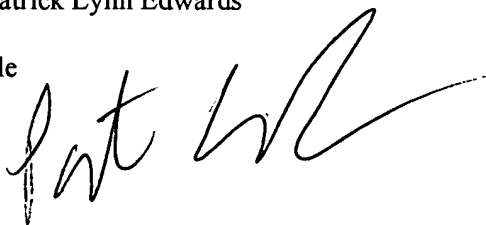
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (703) 305-6301. The examiner can normally be reached on 8:30am - 5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

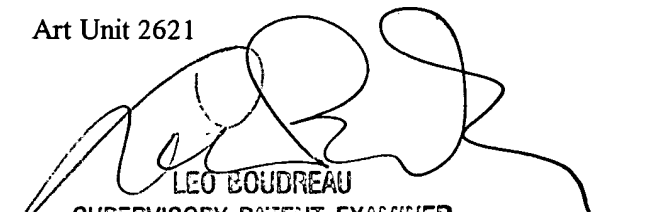
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Patrick Lynn Edwards

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